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August 28, 1998

Magalie Roman Salas
Secretary
Federal Communications Commission
1919 M St., N.W.
Washington, D.C. 20554

RECEIVED

AUG 28 1998

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Re: Federal-State Joint Board on Universal Service,
CC Docket No. 96-45;
Forward-Looking Mechanism for High Cost Support for
Non-Rural LECs, CC Docket No. 97-160;
Common Carrier Bureau Seeks Comment on Model
Platform Development, DA 98-1587

Dear Ms. Salas:

I am enclosing for filing the original and five copies of Western Wireless Corporation's Comments on Model Platform Development, pursuant to the Public Notice in the above-captioned proceedings, DA 98-1587, released on August 7, 1998. Please contact me if you have any questions regarding this filing.

Respectfully submitted,

David Sieradzki

David L. Sieradzki
Counsel for Western Wireless Corp.

Enclosures

cc: Attached service list

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

RECEIVED

AUG 28 1998

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)	
)	
Federal-State Joint Board on)	CC Docket No. 96-45
Universal Service)	
)	
Forward-Looking Mechanism for High-Cost)	CC Docket No. 97-160
Support for Non-Rural LECs)	
)	
Common Carrier Bureau Seeks Comment)	DA 98-1587
On Model Platform Development)	
)	

**WESTERN WIRELESS CORPORATION
COMMENTS ON MODEL PLATFORM DEVELOPMENT**

Western Wireless Corporation ("Western Wireless"), by its attorneys,
submits these comments in response to the Public Notice, DA 98-1587, released
August 7, 1998. 1/

Introduction

Western Wireless is a cellular and personal communications service
("PCS") carrier specializing in the provision of high-quality, affordable, and reliable
wireless services to subscribers in both rural/high-cost and higher-density urban
areas. Western Wireless currently provides commercial mobile radio service

1/ Public Notice, *Common Carrier Bureau Seeks Comment on Model Platform Development*, CC Docket Nos. 96-45 & 97-160, DA 98-1587 (released Aug. 7, 1998) ("Public Notice").

("CMRS") to more than 700,000 subscribers under licenses in 22 states, covering over 60 percent of the continental United States, as well as Hawaii. In some regions, we believe it will be less costly to provide supported telecommunications services using wireless technologies than by using the wireline systems of incumbent local exchange carriers ("ILECs"). Thus, Western Wireless is seriously interested in providing universal service and helping realize the goals of Section 254 of the Act.

Western Wireless is participating in this proceeding to advance the overall policy goal of *technological and competitive neutrality* in the system for supporting universal service in high-cost and rural areas. ^{2/} To achieve this goal, the Commission must ensure, first, that consumers in high-cost and rural areas have the right to choose to obtain supported services from CMRS providers and other new entrants as well as from ILECs. Second, there must be parity between the revenue support available to all eligible telecommunications carriers, regardless of those carriers' technologies, rate structures, or regulatory status. Third, support must be available for mobile, as well as stationary, services that meet the Commission's definitions of supported universal service, and for wireless as well as wireline local loops.

^{2/} This goal already has been endorsed by the Commission and the Joint Board. *Federal-State Joint Board on Universal Service*, First Report and Order, 12 FCC Rcd 8776, 8858, 8932, ¶¶ 145, 287 (1997), *pet. for review pending*.

The HAI Wireless Model

The Commission has observed that “to the extent practical, the selected mechanism should estimate the cost of providing the supported services using wireless technology in areas where wireless technology is likely to be the least-cost, most efficient technology.” ^{3/} At the same time, the Commission stated that it had received “almost no information regarding how to estimate such costs,” and sought comment on “including an additional component in the mechanism that would compare the cost of providing service via a wireless network with the cost of providing service via a wireline network and would choose the lowest-cost technology to calculate the costs of providing the supported services.” ^{4/}

Western Wireless is endeavoring to fill this gap. We have retained HAI Consulting, Inc. to design a wireless cost model. This model estimates the cost of providing universal service over wireless networks in each ILEC wire center area, making it possible to determine whether it is less costly to provide service in that area using wireline technology (as projected by the model or platform to be selected by the Commission) or using wireless technology (projected by the HAI wireless cost model). The HAI wireless cost model can be used in conjunction with whatever platform or hybrid mechanism that the Commission selects to estimate

^{3/} *Federal-State Joint Board on Universal Service, Forward-Looking Mechanism for High Cost Support for Non-Rural LECs*, CC Docket Nos. 96-45 & 97-160, Further Notice of Proposed Rulemaking, 12 FCC Rcd 18514, 18555, ¶ 99 (1997).

^{4/} *Id.*

the forward-looking cost, based on the most cost-effective technology, of providing universal service.

While the HAI wireless cost model is still in an early stage of development, Western Wireless believes that it will show that wireless technology is the least-cost technology in a substantial proportion of high-cost exchanges of non-rural ILECs as well as "rural telephone companies." Western Wireless intends to submit the actual model to the Commission within the next few months, and will provide additional information in the near term. We believe that this wireless cost model can be developed in time to incorporate its results as a factor in determining the level of non-rural ILEC high cost support beginning in July 1999.

Accordingly, Western Wireless strongly agrees with the Commission's tentative conclusion that, in geographic areas where the cost of wireless technology is less than the cost of wireline technology, "providing support based on the cost of a wireless network to provide the supported services would meet the statutory directive that support be 'sufficient.'" ^{5/} Moreover, the Commission *cannot* ignore the results of wireless cost models, because "basing support solely on wireline costs, when wireless technology may offer a less expensive option," certainly would *not* "be consistent with the Commission's conclusion that the mechanism should use the least-cost, most-efficient . . . technology available." ^{6/}

^{5/} *Id.*, 12 FCC Rcd at 18556, ¶ 101.

^{6/} *Id.*

Features of the HAI Wireless Cost Model

The HAI wireless cost model estimates the total service cost, using wireless technology, of providing telecommunications in each ILEC wire center area. The model can reflect the engineering features of AMPS (*i.e.*, analog cellular) technology, which tends to be the least-cost wireless technology in high-cost and rural areas, or can reflect other technologies, such as various formats of digital cellular and PCS.

The HAI wireless cost model uses the switching, transport, and signalling information generated by the standard HAI wireline model, as well as standard expense-to-investment and uncollectible factors. The principal difference is the use of wireless technology to estimate "loop" costs. We believe the wireless model could be used as a "module" in connection with whatever basic wireline platform the Commission selects.

The model uses several conservative assumptions to project the costs of universal service using wireless technology. First, the model examines the cost of providing *fixed* wireless local loop service, which is more costly to deploy than *mobile* wireless service. The additional cost is due in part to the cost of special customer premises equipment ("CPE") used for converting signals from the AMPS format to the format used by standard wireline telephones. In addition, the model projects traffic loads, and the necessary infrastructure to handle such traffic (including cell sites and backhaul facilities), based on the amount of traffic that

users typically generate on wireline telephone networks, even though wireless mobile users typically generate significantly less traffic.

Two of the key factors in the model are the geographical location of customers ^{7/} and the traffic generated by those customers, which together are the main determinants of the number and location of cell sites. In turn, the geographic area covered by each cell site is correlated with the height of the tower, which is an important cost component. The model also accounts for the costs of microwave or landline backhaul from cell sites to wireless switching offices. The cost of spectrum is estimated based on data from the Broadband PCS D-E-F bands spectrum auctions, per-pop bid amounts, adjusted to reflect the difference between the amount of spectrum available in the D-E-F bands and that available to RSA cellular operators.

A summary presentation regarding the model is attached as Appendix A.

Platform Issues

The Public Notice seeks comment on geocoded customer location data and other approaches for modeling the location and grouping of customers. Western Wireless observes that the location of customers may be less significant with respect to the wireless cost model than it is for wireline cost models, for several reasons.

^{7/} We discuss the customer location issues raised in the Public Notice in the following section.

First, while customer location is a relevant factor in the cost of wireless service, it is less significant as a determinant of the total cost of service for wireless than for wireline service, due to obvious technological differences. In particular, given that the HAI wireless model estimates the cost of *total* service over a wireless network (*i.e.*, like the wireline models, it assumes that all customer demand is served by the wireless network), traffic capacity tends to overwhelm customer location and grouping as the most significant factor in determining the number of cell sites, in most cases for which the model has been run to date.

Moreover, once the assumption used in the HAI Wireless Model of *fixed* wireless service is relaxed, the fact that customers may use wireless telecommunications on a *mobile* basis renders the locations of their residences less significant as a cost determinant. For these reasons, the exact methodology used to determine customer location and grouping is less significant -- and requires less precision -- for the wireless model than for the wireline models.

Conclusion

In sum, wireless carriers like Western Wireless can play a significant role in providing supported universal service in high-cost areas. The wireless cost model that we are preparing to submit will demonstrate that wireless carriers can provide universal service, in a significant number of areas, more efficiently and at a lower cost than wireline ILECs. The Commission must take into account these wireless cost factors in its process of analyzing platforms and cost models for determining the level of support in high-cost areas. This will ensure that the total

cost of the high-cost support program is based on the most efficient and least costly technology -- and will empower Americans in high-cost areas to choose their universal service from a range of competing providers and technologies.

Respectfully submitted,

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Attorneys for Western Wireless Corp.

Dated: August 28, 1998

HWM

HAI Consulting, Inc. Wireless Model



Washington D.C.

August 26, 1998



HWM Overview

- ◆ Development sponsored by Western Wireless Corporation
- ◆ Engineering and cost model that calculates the cost of providing wireless local access
- ◆ Examines AMPS technology (cost effective in low density areas)
- ◆ Uses inputs from HM 5.0a wireline model results

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HWM Features

- ◆ Incorporates cluster, cost and investment data from HM5.0a
- ◆ Provides results by state and wire center
- ◆ Estimates wireline and wireless investment, monthly costs and USF subsidy levels
- ◆ Provides data suitable for mapping

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HWM Approach and Modeling Environment

- ◆ “Bottom Up” modeling process
- ◆ Uses Cluster data and current wireline access traffic loads to determine cell site, radio equipment and backhaul requirements
- ◆ Integrates transport, switching, signaling and other cost data from HM5.0a
- ◆ Model developed using Microsoft Excel and Access

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Data Pre-processing

- ◆ Before creating a specific state model, data “pre-processing” is required
- ◆ Cluster Pre-processing (MS Access)
 - ◆ Pulls data for a state from HM 5.0a Cluster database
 - ◆ Based technology specific engineering parameters, clusters are analyzed and divided by line count
 - ◆ Cell site coverage and capacity requirements are determined
 - ◆ Data written to an Excel spreadsheet and copied into HWM template

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Cluster Analysis

- ◆ Clusters over a certain line size are considered “Target Clusters”
 - ◆ Target Cluster area and line data are averaged
 - ◆ Target Clusters have cell sites built specifically to serve them with adequate height and channels to meet calculated coverage and traffic load
- ◆ “Non Target Clusters”
 - ◆ Area and line data are aggregated for clusters that do not meet requirements to be Target Clusters
 - ◆ Cell sites are specified to meet total coverage and traffic load for Non Target Cluster area

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Data Pre-processing (Cont'd)

- ◆ HM 5.0a Pre-processing
 - ◆ HM 5.0a is run for all companies in a state. Default values are used.
 - ◆ Data from "Investment Input" output sheet aggregated by wire center into a single Excel worksheet
 - ◆ Aggregated data put into a HWM pre-processing workbook, resulting new worksheet copied into HWM template

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Wireless Model Cost Factors

- ◆ Two cost factors derived from HM 5.0a results are used in HWM
 - ◆ Radio equipment monthly cost factor
 - ◆ The ratio of annual cost and overhead factors to total investment
 - ◆ Applied to wireless investment to determine a monthly cost
 - ◆ Retail uncollectible factor
 - ◆ The cost of uncollectible billings as a % of monthly cost

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HWM State Model Template

- ◆ MS excel 97 workbook with integrated worksheets
 - ◆ “Model Assumptions”
 - ◆ “Lookup Tables”
 - ◆ “Cluster and Cell Analysis”
 - ◆ Cluster pre-processing data
 - ◆ “HM Costs”
 - ◆ HM 5.0a pre-processing data and factors
 - ◆ “WC Data”
 - ◆ “Summary Model Results”

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HWM Variable Inputs

- ◆ Model Assumptions Worksheet
 - ◆ User interface for costs and inputs to the model
 - ◆ Capacity Variables
 - ◆ Backhaul Facilities Expense Variables
 - ◆ Recurring Subscriber Expense Variables
 - ◆ Subscriber and Subscriber Premises Investment, Acquisition and Operating Variables
 - ◆ USF Subsidy Thresholds
 - ◆ Also generates inputs for Cluster pre-processing

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HWM Variable Inputs (Cont'd)

- ◆ **Lookup Tables Worksheet**
 - ◆ **Site Investment**
 - ◆ Varying height towers based on coverage requirement
 - ◆ Provides tower and structure investment detail
 - ◆ **Traffic Analysis and Radio Channel Investment**
 - ◆ Based on offered load from cluster lines in cell
 - ◆ **Microwave System Costs**
 - ◆ Based on backhaul requirements

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The WC Data Worksheet

- ◆ **The "Engine" of HWM**
 - ◆ Performs all wireless cost and investment calculations by wire center
 - ◆ Integrates inputs, data and factors from HM 5.0a and Model Assumptions to produce results
 - ◆ Contrasts wireless vs. wireline results
 - ◆ Identifies wireless or wireline advantages by wire center
 - ◆ Performs certain results checking tests

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Summary Model Results Worksheet

- ◆ State Geographic and Demand Data
 - ◆ General information in, and results from, the model
- ◆ Investment Summary for The Entire State
- ◆ USF Subsidy Summary Results
- ◆ USF Subsidy Analysis
 - ◆ Wireline vs. Wireless

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Summary Model Results (Cont'd)

- ◆ Estimated "Tapered" Subsidy
 - ◆ Analysis of the subsidy requirements if the most cost-effective technology is selected for each wire center
- ◆ Wireless vs. Wireline Costs - All Wire Centers
 - ◆ CLLIs With A Wireline Cost Advantage
 - ◆ CLLIs With A Wireless Cost Advantage
- ◆ Cell Site Coverage Tests
 - ◆ Engineering validation to be sure no CLLIs with a wireless cost advantage have had more cell sites calculated than can realistically be built

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Other Model Features

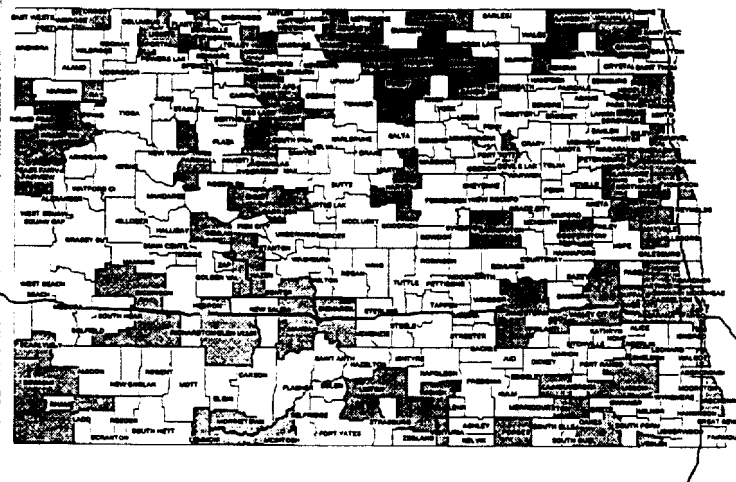
- ◆ ILEC Summary Worksheet
 - ◆ Predefined Pivot Table for additional analysis
- ◆ Mapping Data Worksheet
 - ◆ Highlights certain results for export to MapInfo and similar mapping programs

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**North Dakota Wireless vs. Wireline USF Subsidy Analysis
By Wirecenter Serving Area, Preliminary HAI Wireless Model
Estimates & HAI Model 5.0a Costs with Default Model Inputs**

□ Wireless Cost Advantage
■ Wireline Advantage or No Data



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CERTIFICATE OF SERVICE

I, Cecelia Burnett, hereby certify that on this 28th day of August, 1998, copies of the Western Wireless Corporation Comments On Model Platform Development were served on the parties listed below by hand delivery or first class mail.


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